

Test #2 (Part 2, Calculator Okay)

Math 150, Prof. Beydler

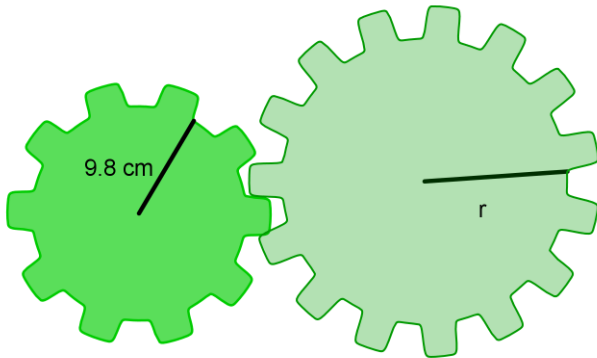
Name: _____

Thursday, April 20, 2017

Directions: Show all work. No books or notes. A **scientific calculator** is allowed. Your desk and lap must be clear (no phones, no smart watches, etc.). Write your answers in the indicated places, or box your answers. Good luck!

1. (2 points) Two gears are aligned so that the smaller gear drives the larger one (see below). When the smaller gear rotates 140° , the larger gear rotates 120° . What is the radius of the larger gear?

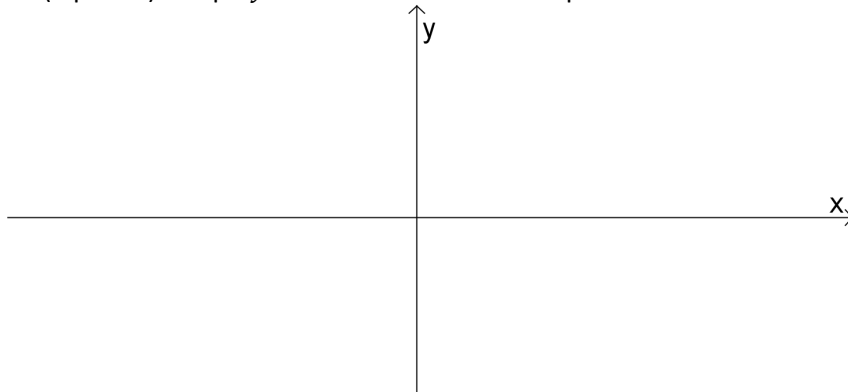
Answer: _____



2. (2 points) Find the linear speed v of the tip of the second hand of a clock, if the hand is 10 cm long. (Leave your answer in exact form, and be sure to write the correct units.)

Answer: _____

3. (4 points) Graph $y = -2 \sin \pi x$ over a one-period interval. Be sure to show the 5 key points.

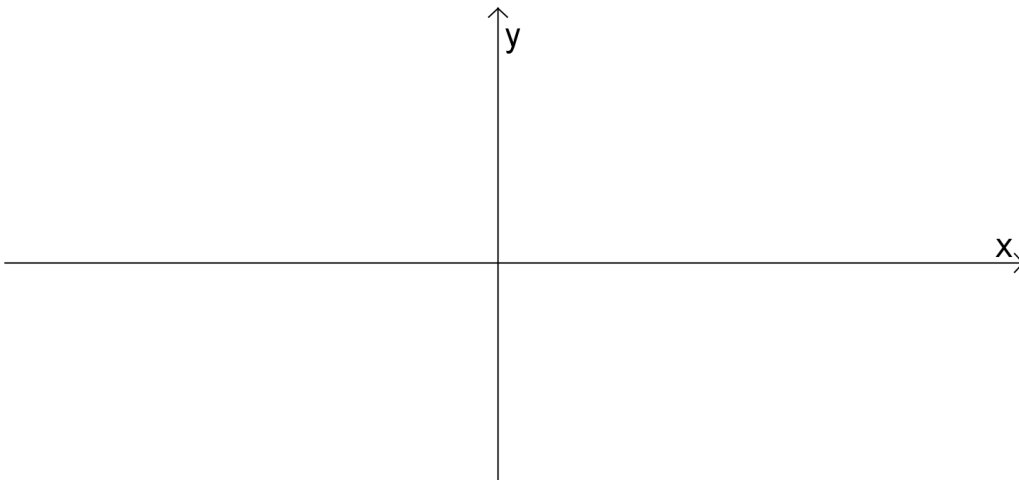


4. (5 points) Graph $y = 3 \cos\left(x + \frac{\pi}{4}\right)$ over a one-period interval and find the amplitude, period, and phase shift. Be sure to show the 5 key points.

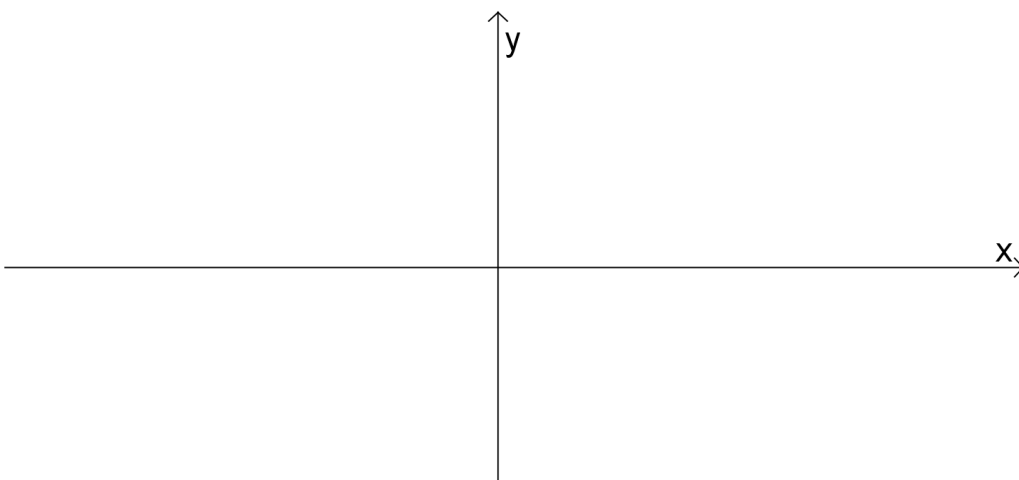
Amplitude: _____

Period: _____

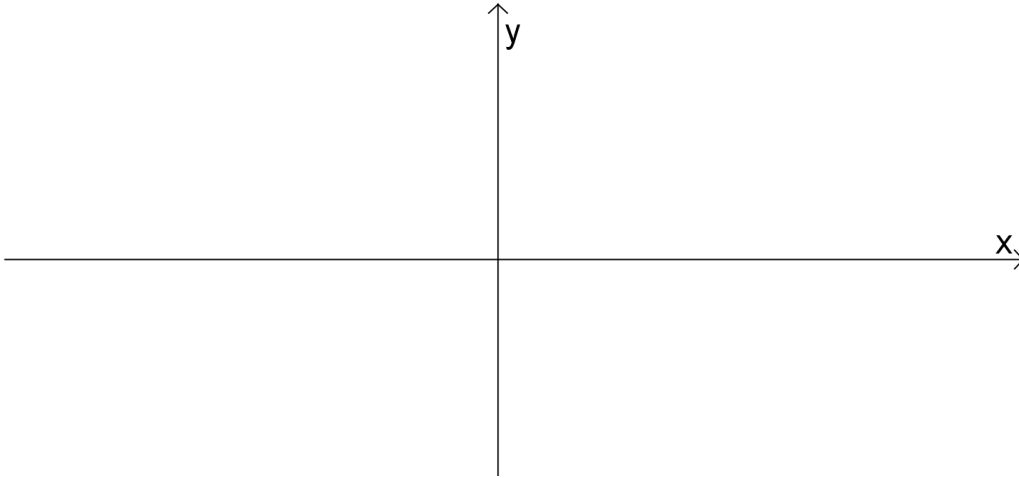
Phase shift: _____



5. (4 points) Graph $y = -1 + \tan\left(2x + \frac{\pi}{3}\right)$ over a one-period interval. Be sure to show the 5 key points/asymptotes.



6. (4 points) Graph $y = 1 + \csc 3\left(x - \frac{\pi}{2}\right)$ over a one-period interval. Be sure to show the 5 key points/asymptotes.



7. (2 points) Write $\csc x$ in terms of $\cos x$.

$$\csc x = \underline{\hspace{2cm}}$$

8. (3 points) Find the exact value of $\tan \theta$ if $\csc \theta = -\frac{3}{2}$ and $\cos \theta > 0$.

$$\tan \theta = \underline{\hspace{2cm}}$$

9. (3 points) Verify that the following equation is an identity.

$$\frac{\sec x + 1}{\tan x} = \frac{\tan x}{\sec x - 1}$$

10. (3 points) Verify that the following equation is an identity.

$$\frac{\sin x + \tan x}{1 + \cos x} = \tan x$$

11. (3 points) Verify that the following equation is an identity.

$$\frac{1 + \cos x}{1 - \cos x} - \frac{1 - \cos x}{1 + \cos x} = 4 \cot x \csc x$$

12. (4 points) Find the exact value of $\sin(x + y)$ given that $\tan x = -\frac{3}{4}$, $\sin y = -\frac{5}{13}$, $90^\circ < x < 180^\circ$, and $270^\circ < y < 360^\circ$.

Answer: _____

13. (3 points) Verify that the following equation is an identity.

$$\tan x + \cot y = \frac{\cos(x - y)}{\cos x \sin y}$$

14. (3 points) Find the exact value of $\cos(-75^\circ)$.

Answer: _____